

In re Patent Application of:
ZIARI et al
Serial No. 10/016,473
Filed: December 10, 2001

IN THE CLAIMS

1. (currently amended) An optical connection module for attaching an optical component to a substrate and aligning said optical component with a first laser, comprising:

a substrate;

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a fiber submount that is attached to said substrate and that includes a thermally insulating material having a thickness greater than 20 micrometers;

an optical component that is soldered to said fiber submount using heat from a second laser;

a laser submount attached to said substrate; and

a first laser that is attached to said laser submount, whereby said first laser is substantially aligned with said optical component.

2. (original) The optical connection module of claim 1 wherein said optical connection module is a fiber-coupled laser module and said optical component is an optical fiber.

3. (original) The optical connection module of claim 1 further comprising a fiber bonding pad located between said thermally insulating material and said optical component.

4. (currently amended) The optical connection module of ~~claim 1~~ claim 3, wherein said fiber bonding pad and said thermally insulating material conduct heat locally during soldering to uniformly melt said solder.

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5. (original) The optical connection module of claim 3 wherein said thermally insulating material and said fiber bonding pad limit heat transfer to said substrate during soldering.

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6. (original) The optical connection module of claim 3 wherein said fiber bonding pad performs at least one of providing a solder dam, absorbing laser light, laterally conducting heat, and improving the strength of an attachment between said optical component and said substrate.

7. (original) The optical connection module of claim 6 wherein said fiber bonding pad includes:

a first layer; and

a second layer having one side connected to said first layer.

8. (currently amended) The optical connection ~~laser~~ module of claim 7 wherein said fiber bonding pad further includes a third layer having one side adjacent to said second layer.

9. (currently amended) ~~The laser module~~ The optical connection module of claim 7, wherein said first layer comprises ~~is made of~~ Au.

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10. (currently amended) ~~The laser module~~ The optical connection module of claim 7, wherein said second layer comprises ~~is~~ a material that absorbs laser light.

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11. (currently amended) The optical connection module of claim 7, wherein said second layer comprises ~~acts as~~ a solder dam.

12. (currently amended) The optical connection module of claim 7 wherein said second layer comprises a material ~~is~~ selected from the group consisting of Ni, Cr, Ti and CrO.

13. (currently amended) The optical connection module of claim 8, wherein said third layer comprises ~~is made of~~ Ti.

14. (original) The optical connection module of claim 8 further comprising a fourth layer located between said second and third layers.

15. (currently amended) The optical connection module of claim 14 wherein said fourth layer comprises ~~is made of~~ Pt.

16. (original) The optical connection module of claim 1 wherein said thermally insulating material is selected from the group of glass and ceramic.

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17. (original) The optical connection module of claim 1 wherein said solder is selected from the group of AuSn, PbSn and AuGe.

18. (currently amended) The optical connection module of claim 1, wherein said laser submount is comprised of a material selected from the group consisting of AlN, AlNi, SiC, BeO, TcBN, diamond and Si.

19. (original) The optical connection module of claim 18 wherein said optical component is an active optical component.

20. (currently amended) The optical connection module of claim 18, 19 wherein said optical component is a passive optical component.

21. (original) The optical connection module of claim 1 wherein said optical component is selected from the group of optical fiber, mirrors, lenses, detectors, microelectromechanical (MEMS) devices, and isolators.

22. (currently amended) An A optical connection module for attaching an optical component to a substrate and for aligning said optical component to a first laser, comprising:

a substrate;

a fiber submount attached to said substrate and including a fiber bonding pad and a thermally insulating material that has a thickness greater than 20 micrometers and

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wherein said fiber submount conducts heat locally during soldering to uniformly melt said solder and insulates heat transfer to said substrate;

an optical component that is soldered to said fiber bonding pad with heat that is produced by a second laser;

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and
a laser submount that is attached to said substrate;

and
a first laser that is attached to said laser submount, whereby the first laser is substantially aligned with said optical component.

23. (original) The optical connection module of claim 22 wherein said fiber bonding pad performs at least one of providing a solder dam, absorbing laser light, laterally conducting heat, and improving the strength an attachment between said optical component and said substrate.

24. (original) The optical connection module of claim 23 wherein said fiber bonding pad includes:

a first layer; and

a second layer having one side connected to said first layer.

25. (original) The optical connection module of claim 24 wherein said fiber bonding pad includes a third layer having one side adjacent to said second layer.

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26. (currently amended) The optical connection module of claim 24 wherein said first layer comprises ~~is made of~~ Au.

27. (currently amended) The optical connection module of claim 24 wherein said second layer comprises ~~is~~ a material that absorbs laser light.

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28. (currently amended) The optical connection module of claim 24, wherein said second layer comprises ~~acts as~~ a solder dam.

29. (currently amended) The optical connection module of claim 24, wherein said second layer comprises a material ~~is~~ selected from the group consisting of Ni, Cr, Ti and CrO.

30. (currently amended) The optical connection module of claim 25 wherein said third layer comprises ~~is made of~~ Ti.

31. (original) The optical connection module of claim 25 further comprising a fourth layer located between said second and third layers.

32. (currently amended) The optical connection module of claim 31 wherein said fourth layer comprises ~~is made of~~ Pt.

33. (original) The optical connection module of claim 22 wherein said solder is selected from the group of AuSn, PbSn, and AuGe.

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34. (currently amended) The optical connection module of claim 22 wherein said laser submount comprises a material ~~is~~ selected from the group consisting of AlN, AlNi, SiC, TcBN, BeO, diamond and Si.

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35. (original) The optical connection module of claim 22 wherein said optical component is at least one of active and passive optical components.

36. (original) The optical connection module of claim 22 wherein said optical component is selected from the group of optical fiber, mirrors, lenses, detectors, microelectromechanical devices, and isolators.

37. (currently amended) An integrated optical connection module for attaching an optical component to a substrate and for aligning said optical component to a first laser, comprising:

a substrate;

a thermally insulating material formed integrally in said substrate and having a thickness greater than 20 micrometers;

a fiber bonding pad including at least one metallic layer attached to said thermally insulating material;

an optical component that is soldered to said fiber bonding pad; and

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a first laser located on said substrate, whereby the first laser is substantially aligned with said optical component.

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38. (original) The integrated optical connection module of claim 37 wherein said fiber bonding pad conducts heat locally during soldering to uniformly heat said solder using a second laser and insulates heat transfer from said solder to said substrate.

39. (original) The integrated optical connection module of claim 37 wherein said fiber bonding pad performs at least one of providing a solder dam, absorbing laser light, laterally conducting heat, and improving the strength an attachment between said optical component and said substrate.

40. (original) The integrated optical connection module of claim 37 wherein said fiber bonding pad includes:

a first layer; and

a second layer having one side connected to said first layer.

41. (original) The integrated optical connection module of claim 40 wherein said fiber bonding pad includes a third layer having one side adjacent to said second layer.

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42. (currently amended) The integrated optical connection module of claim 40, wherein said first layer comprise ~~is made of~~ Au.

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43. (currently amended) The integrated optical connection module of claim 40, wherein said second layer comprises ~~is~~ a material that absorbs laser light.

44. (currently amended) The integrated optical connection module of claim 40, wherein said second layer comprises ~~acts as~~ a solder dam.

45. (currently amended) The integrated optical connection module of claim 40, wherein said second layer comprises a material ~~is~~ selected from the group consisting of Ni, Cr, Ti and CrO.

46. (currently amended) The integrated optical connection module of claim 41, wherein said third layer comprises ~~is made of~~ Ti.

47. (original) The integrated optical connection module of claim 41 further comprising a fourth layer located between said second and third layers.

48. (currently amended) The integrated optical connection module of claim 47, wherein said fourth layer comprises ~~is made of~~ Pt.

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49. (original) The integrated optical connection module of claim 37 wherein said thermally insulating material is selected from the group of glass and ceramic.

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50. (original) The integrated optical connection module of claim 37 wherein said solder is selected from the group of AuSn, PbSn, and AuGe.

51. (original) The integrated optical connection module of claim 37 wherein said thermally insulating material is attached to said substrate using anodic bonding.

52. (original) The integrated optical connection module of claim 51 wherein at least one lateral gap that is formed between said substrate and said thermally insulating material is filled with glass frit.

53. (original) The integrated optical connection module of claim 52 wherein said glass frit is annealed and polished.

54. (original) The integrated optical connection module of claim 37 wherein said thermally insulating material is formed using flame hydrolysis.

Claims 55-67 cancelled.

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68. (new) The integrated optical connection module of claim
37, wherein the thermally insulating material is formed
integrally in said substrate by patterning and etching a first
region of the substrate.
